

COMPUTERFACTS™

Technical Service Data

EPSON®
MODEL LX800(P70RA)
PRINTER



FEATURES COMPLETE SCHEMATICS • PRELIMINARY SERVICE CHECKS • TROUBLESHOOTING TIPS •
EASY-READ WAVEFORMS • REPLACEMENT PARTS LISTS • SEMICONDUCTOR CROSS-REFERENCE

PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool which is designed for quick isolation and repair of Printer malfunctions.

Check all interconnecting cables for good connection and correct hook-up before making service checks.

Always turn Printer OFF before connecting or disconnecting connectors, boards or peripherals.

TEST EQUIPMENT

Digital Volt/Ohm Meter

TOOLS

Phillips Screwdriver
Small Screwdriver
Soldering Iron

REPLACEMENT PARTS AND DESCRIPTION

C10	Electrolytic	1000uF 25V
C15	Electrolytic	1uF 50V
C22	Electrolytic	6800uF 50V
C23	Electrolytic	470uF 10V
C26	Electrolytic	2200uF 35V
D1	Diode	
D7	Diode	
DB1	Bridge Rectifier	
F1	AC Fuse 1.25A @ 125V	
F2	DC Fuse 3.15A @ 125V	
IC3A	Regulator IC	
L1	RF Choke	
L2	RF Choke	
M1	Carriage Motor	
M2	Paper Feed Motor	
M3	Print Head	
S1	Power Switch	
T1	Power Transformer	

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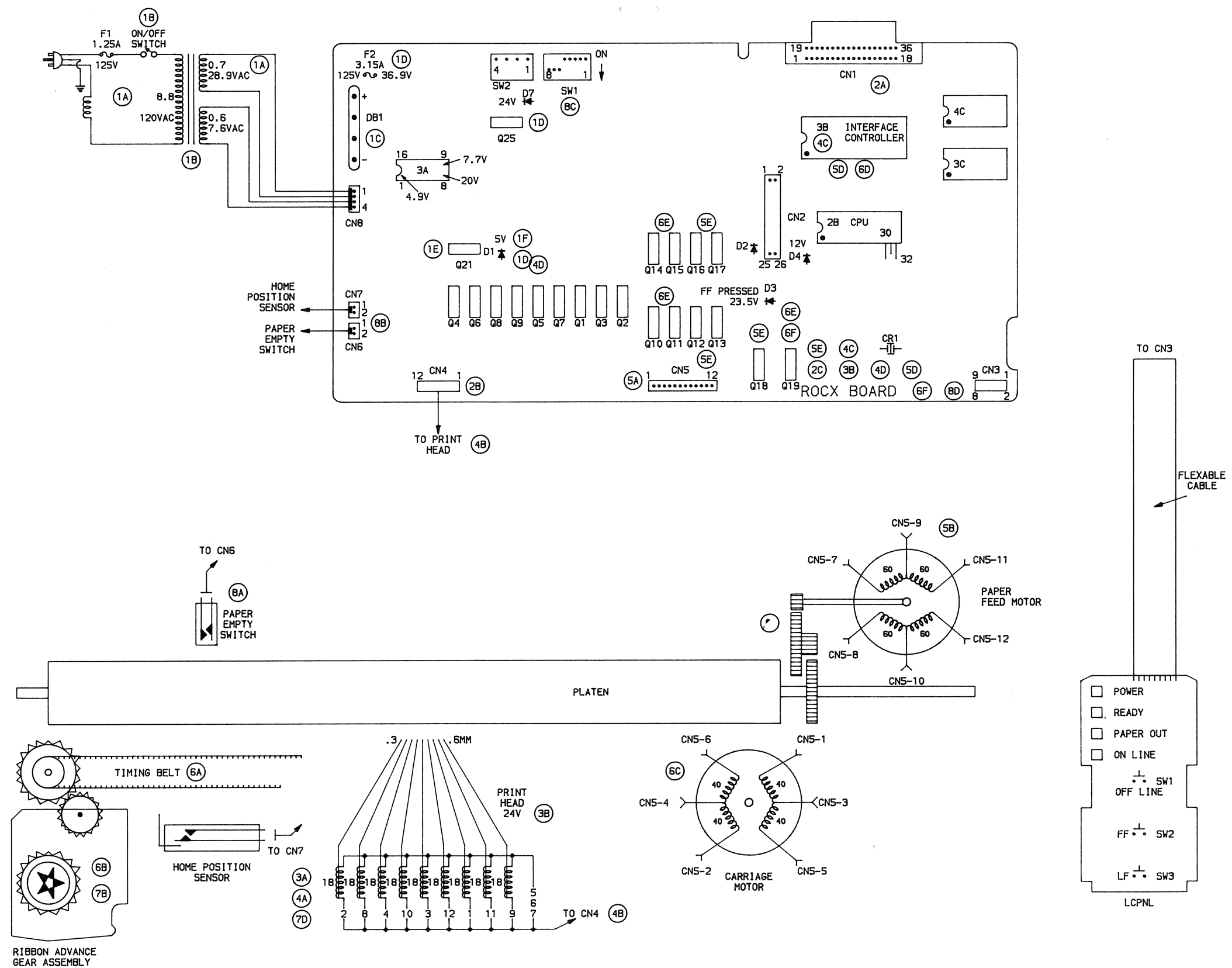
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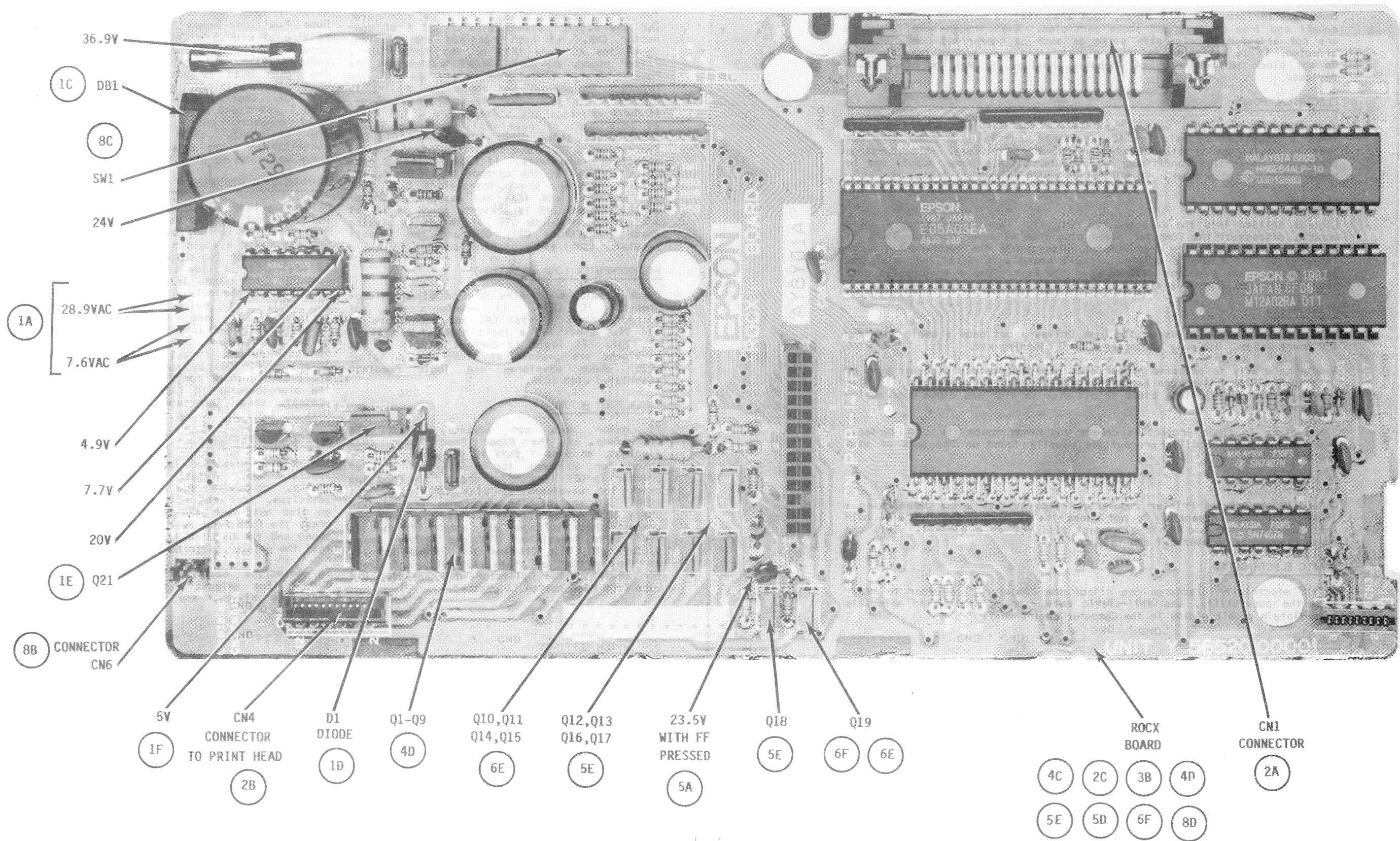
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PRELIMINARY SERVICE CHECKS (Continued)



PRELIMINARY SERVICE CHECKS (Continued)



ROCX MAIN BOARD

X

ROCX MAIN BOARD

III

CP53
MODEL LX800(P70RA)

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PRELIMINARY SERVICE CHECKS (Continued)

PREVENTATIVE MAINTENANCE

ENVIRONMENT

Computers perform best in a clean, cool area that is below 80 degrees Fahrenheit and free of dust and smoke particles. Even though home Computers are not affected by cigarette smoke as much as commercial Computers are affected, it is better to maintain a smoke-free area around the Computer. Do not block cabinet vents of Computer, Monitor, Printer or other power devices.

ELECTRICAL POWER

Variations in the line voltage can affect the Computer. Try to avoid these fluctuations by using an AC receptacle that is on a power line not used by appliances or other heavy current demand devices. A power-surge protector, power-line conditioner or noninterruptible power supply may be needed to cure the problem. DO NOT switch power On and Off frequently.

KEYBOARD

Liquids spilled into the Keyboard can ruin it. Immediately after a spill occurs, disconnect the Computer power plug from AC power outlet. Then, if circuitry or contacts are contaminated, disassemble the Keyboard and carefully rinse the Keyboard printed circuit board with distilled water and let it dry. Use a cotton swab between the keys. Use a nonabrasive contact cleaner and lint-free wipers on accessible connectors and contacts.

DISK DRIVES

Clean the read/write heads of the Disk Drives about once a month or after 100 hours usage. Use only an approved head cleaning kit.

Handle carefully to preserve proper disk head alignment. A sudden bump or jolt to the Disk Drives can knock the disk head out of alignment. If Disk Drive must be transported, place an old disk in slot and close door during transport.

Store disks in their protective covers and never touch the disk surface. Observe the disk handling precautions usually found on the back of disk protective covers.

PRINTERS

Carefully vacuum the Printer regularly. Wipe surface areas clean using a light all-purpose cleaner. Do not clean the machine. The oil will collect abrasive grit and dust. The dust will act as a blanket. This can cause components to overheat and fail.

STATIC ELECTRICITY

Static electricity discharge can affect the Computer. In order to minimize the possibility, use anti-static mats, sprays, tools and materials and maintain good humidity in the Computer environment.

MONITOR

Use an isolation transformer with any Monitor that does not come as part of the system since some Monitors use a HOT chassis (chassis connected to one side of the AC line). The face of the Monitor should never be left on for long periods of time at high brightness level except when pattern is being changed periodically. Use caution when cleaning anti-glare screens to preserve the glare-reduction feature.

PRELIMINARY SERVICE CHECKS (Continued)

DISASSEMBLY INSTRUCTIONS

UPPER CASE REMOVAL

Remove sheet guide, printer cover, tractor unit and paper guide. Insert a standard flat screwdriver into the two holes at the front of the lower case. Unlock the upper case guides by pushing them towards the front using the edge of the screwdriver. When notches are unlocked remove the upper case. Disconnect the flexible cable of the control panel from connector CN3 on the ROCX board and remove upper case.

CONTROL PANEL REMOVAL

Remove upper case, turn upper case over and push in the two notches securing the control panel to upper case. Remove control panel from upper case.

MAIN BOARD ROCX REMOVAL

Remove upper case and disconnect connectors CN5, CN4, CN6, CN7 and CN8 on ROCX board. Remove one screw securing ROCX board to base plate. Loosen six bent tabs for the lower case that secure the ROCX main board to the lower case. Remove the ROCX board.

POWER FILTER UNIT REMOVAL (ROC)

Remove the upper case, disconnect the cable connecting the ROC Filter unit to the ROCX board from connector CN8 on the ROCX board. Remove five screws securing the ROC Filter unit to base plate. Remove ROC Filter unit including AC cable and Power Switch.

PRINthead REMOVAL

Remove printer cover and confirm that the paper and ribbon cartridge have been removed. Unlock two levers securing print head to carriage. Lift print head to remove it and pull out Head cable.

PRINTER MECHANISM REMOVAL

Remove upper case, remove platen unit and paper guide by turning shaft holders at the left and at the right up, and lift platen unit and remove it. Disconnect cable from connector CN6 on ROCX board. Unlock the two notches of paper guide one on each end, push the two notches towards the front and remove the paper guide. Disconnect cables from connectors CN4, CN5 and CN7 on ROCX board. Loosen six tabs for lower case securing printer mechanism, loosen two tabs on the left side and lift the left side up about 1cm, then loosen the tab on the back of the mechanism towards the right half, then lift the left side a little more. Slide the mechanism towards the left and towards the back. Remove printer mechanism from lower case of the printer.

PAPER FEED MOTOR REMOVAL

Remove printer mechanism, disconnect motor cable from paper-feed motor. Using a screwdriver loosen tab that secures paper-feed motor and turn motor assembly counterclockwise. Remove paper-feed motor.

PAPER END SENSOR REMOVAL

Loosen tab securing paper end sensor. Pull paper end-sensor towards the back. Disconnect CN6 connector from ROCX board. Remove paper-end sensor.

CARRIAGE MOTOR REMOVAL

Remove printer mechanism, remove print head and disconnect head cable. Turn printer mechanism over, move carriage unit over to the cutout opening in the carriage motor frame. Detach timing belt from carriage unit using round end long nose pliers, careful not to damage belt. Remove carriage guide shaft ground plate, slide the plate and lift out of the frame. Disconnect motor cable from carriage motor. Loosen four tabs securing carriage motor frame to chassis frame. Remove belt tension spring from carriage motor frame. Remove E-type retaining ring on carriage motor side, then remove plain washer, belt pulley flange, belt pulley shaft holder and belt pulley. Move carriage motor counterclockwise and remove it. See Figure 1.

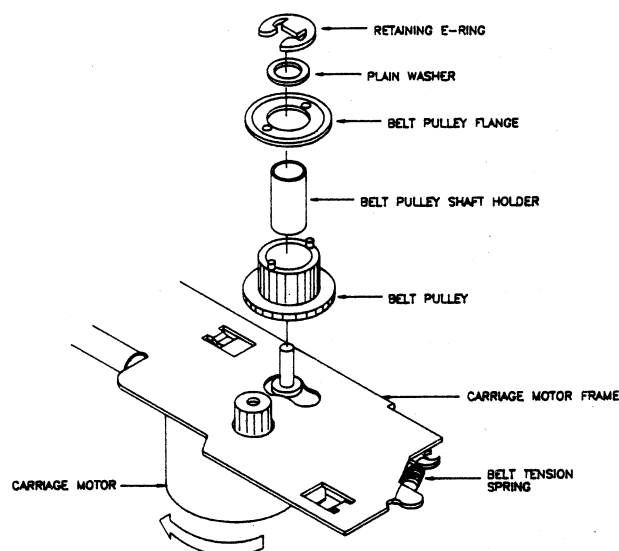


Figure 1

HOME-POSITION SENSOR REMOVAL

Remove carriage motor frame, (see Carriage Motor Removal). Push in the notch of home-position sensor and remove home-position sensor from carriage motor frame.

RIBBON-FEED MECHANISM REMOVAL

Remove printer mechanism, turn printer mechanism over. Loosen tabs for ribbon gear cover while holding cover in place. Place printer mechanism face up and lift ribbon gear cover to remove it.

PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS

MATCH THE NUMBERS ON THE INTERCONNECTING DIAGRAM AND PHOTOS WITH THE NUMBERS ON THE SERVICE CHECKS TO BE PERFORMED.

① PRINTER DEAD

- (A) Check AC Fuse (F1). If Fuse is open, disconnect Power Transformer Connector CN8, switch the printer ON and check for 28.9VAC between pins 2 and 2 of connector CN8, and for 7.6VAC between pins 3 and 4 of connector CN8.
- (B) If voltages are missing, check power switch, AC Fuse (F1), AC Power Cord and also check Power Transformer (T1) windings with an ohm meter.
- (C) If voltages are present, check Diode (DB1) for a short; replace if bad.
- (D) Check Fuse (F2) If Fuse is open, check Diodes D7 and D1 for shorts.
- (E) Check for 24V at the collector of transistor Q21.
- (F) Check for 5V at the cathode of Diode D1.

② WILL NOT RECEIVE DATA FROM COMPUTER

- (A) Check connector cable between the printer and the computer. Check connection to connector CN1.
- (B) Check connector CN4, check the print head cable for broken or cracked circuits and check for good connection at the print head cable terminal.
- (C) Check the Main board (ROCX Board) by substitution.

③ PRINthead WILL NOT PRINT

- (A) Remove power and check resistances of printhead solenoids. Unlock two levers securing print head to carriage assembly, lift printhead to remove it, disconnect print head cable. Check resistance of each solenoid, each should measure about 18 ohms. If resistances are incorrect replace print head.
- (B) Set printer self test and check for 24V at pins 5, 6 and 7 of connector CN4. If the 24V is not present check the ROCX board by substitution.

④ MISSING DOTS IN PRINTOUT

- (A) Check the resistances of print head solenoids (18 ohms). The solenoid which controls the missing dot will measure incorrectly. If all the solenoids measure correctly, check for possible bent or broken print head wires.
- (B) Check the print head cable for cracks and for good connection at both ends.
- (C) If the printhead is normal, check the logic readings at pins 55 thru 63 of IC 3B. If any reading is not correct check the ROCX board by substitution.
- (D) Check voltage readings at Driver Transistors (Q1 thru Q9). If any reading is not correct check the ROCX Board by substitution.

⑤ PAPER FEED DOES NOT FUNCTION

- (A) Check for 23.5V at pins 9 and 10 of connector CN5 with the printer OFF line and Form Feed button pressed.
- (B) Check resistances of Paper Feed motor, check for 60 ohms between pin 9 and pins 7 and 11, and between pin 10 and pins 8 and 12 of Connector CN5.
- (C) Check Paper Feed gear assembly for broken teeth or broken gears.
- (D) Check waveforms at pins 26 thru 29 of IC3B with printer OFF line and Form Feed pressed. If any of the waveforms are incorrect, check the ROCX board by substitutions.
- (E) Check voltages and components associated with transistors Q12, Q13, Q16, Q17 and Q18, with the printer OFF line and Form Feed button pressed. Check the ROCX board by substitution.

⑥ CARRIAGE MOTOR DOES NOT FUNCTION PROPERLY

- (A) Check timing belt for breakage or wearing out.
- (B) Check ribbon advance gear assembly for jamming by dirt or foreign objects.

PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS (CONTINUED)

MATCH THE NUMBERS ON THE INTERCONNECTING DIAGRAM AND PHOTOS WITH THE NUMBERS ON THE SERVICE CHECKS TO BE PERFORMED.

(C) Check resistances of the windings of the carriage motor, check for 40 ohms between pin 3 and pins 1 and 5 and between pin 4 and pins 2 and 6 of connector CN5. If readings are not correct, check carriage motor by substitution.

(D) Set printer in self test mode and check the waveforms at pins 4, 5, 6 and 7 of IC (3B).

(E) Check voltages and components associated with transistors Q10, Q11, Q14, Q15 and Q19.

(F) Check for 24V at the emitter of transistor Q19. Check the ROCX Board by substitution.

(B) Check the Ribbon Advance gear assembly for free movement.

(C) Check the spacing between the print head and the platen, and also check position of the Head Adjustment lever.

(D) Check for a defective print head.

8 PAPER OUT SENSOR DOES NOT FUNCTION

(A) Check continuity of the paper Empty switch.

(B) Check the connection of CN6 connector.

(C) Check that Dip switch 1-4 is OFF (active position) for paper-out detection.

(D) Check ROCX board by substitution.

7 POOR QUALITY PRINT

(A) Ribbon cartridge may be worn and need to be replaced.

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LINE DEFINITIONS

A0 THRU A14 Address Bits 0 Thru 14
ACKNLG Acknowledge Data Received At Printer
ALE Address Latch Enable
AUTO FEED XT Automatic Paper Feed, External
BUSY Busy, Off Line, Data Entry, Paper Feed, Printing
BUZZER Buzzer Actuation
CE Chip Enable, ROM Memory
CS1 Chip Select Line 1
D0 THRU D7 Data Bits 0 Thru 7
DATA 1 THRU DATA 8 Data Bits 1 Thru 8, Parallel
ERR Error, Off-Line, Paper End, Motor Problems
FIRE Print Head Solenoid Drive Pulse
HD1 THRU HD9 Print Head Driving Pulses
INIT Initialize, Printer Memory Cleared

P/S Parallel/Serial Select
PA0, PA2 Port A, Bits 0, 2
PB0 THRU PB7 Port B, Bits 0 Thru 7
PC2 Port C, Bit 2, Line Feed Motor Enable
PE Paper Empty Sensor
PE LP Paper Empty Lamp
RD Read Data
RESET Reset
RXD Received Data, Acknowledge
SLCT IN Select Input, Enables Printing Control Conditions
STROBE Strobe Pulse For Read In Data
TXD Transmitted Data
WR Write, Data Bus Info Stored In Memory Or I/O

PRELIMINARY SERVICE CHECKS (Continued)

GENERAL OPERATING INSTRUCTIONS

SELF TEST

Press LINE FEED button while turning power ON. The printer should go into self test mode printing DRAFT. If the FORM FEED button is pressed the printer will print the self test pattern in near letter quality.

BUZZER AND ERROR FUNCTIONS

The buzzer rings under the following cases:

1. When a BEL code is sent to the printer the buzzer rings once. (for 0.1 sec)

2. When the NLQ Roman font is set using the NLQ/FORMFEED Switch, the buzzer rings twice (for 0.1 sec each)

3. When the NLQ Sans serif font is set using the NLQ/FORMFEED Switch, the buzzer rings three times (for 0.1 sec each)

4. When paper out is detected the buzzer rings eight times (for 0.5 sec each)

5. When hardware error is detected the buzzer rings five times (for 0.5 sec each)

MISCELLANEOUS ADJUSTMENTS

PRINT HEAD PLATEN GAP ADJUSTMENT

Perform this adjustment when the carriage guide shaft or shaft levers are rotated or removed or the printing is abnormal. Remove printer mechanism, remove print head and remove ribbon mask by pulling it forward and lifting up. Reinstall the print head and install the paper guide and the platen unit on the printer mechanism. Set the head adjust lever at the position nearest the platen. Manually, move the carriage to the paper end sensor lever position. Insert a thickness gauge 0.47mm between the platen and the print head. Adjust the left and right carriage guide shaft lever so that the gap becomes $0.47 \pm 0.02\text{mm}$. Perform the above adjustment at the 10th and 70th column positions and at the middle of the platen. When gaps at all three positions are the same the adjustment is complete.

TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

Equipment	B & K Precision Equipment No.	Sencore Equipment No.	Notes
OSCILLOSCOPE	1570A,1590A,1596	SC61	
LOGIC PROBE	DP51,DP21		
LOGIC PULSER	DP101,DP31		
DIGITAL VOM	2830,2806	DVM37,DVM56,SC61	
ANALOG VOM	277,111,116		
ISOLATION TRANSFORMER	TR110,1604,1653,1655	PR57	
FREQUENCY COUNTER	1803,1805	FC71,SC61	
COLOR BAR GENERATOR	1211A,1251,1260,1249	CG25,VA62	
RGB GENERATOR	1260,1249		
FUNCTION GENERATOR	3020,3011,3030		
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44 PR-28(HV)	HP200	
TEMPERATURE PROBE	TP-28,TP-30		
CRT ANALYZER	467,470	CR70	
DIGITAL IC TESTER	560,550,552		
CAPACITANCE ANALYZER		LC53,LC75,LC76 LC77	
INDUCTANCE ANALYZER		LC53,LC75,LC76 LC77	

PRELIMINARY SERVICE CHECKS (Continued)

TROUBLESHOOTING

PRINTER DEAD

Connect 120VAC and turn power switch ON, check for 29VAC between pins 1 and 2 of connector CN8 and 7.7VAC between pins 3 and 4 of connector CN8. If both readings are missing, check the AC Fuse (F1) on the Power Supply Filter board, AC cord, ON/OFF switch and the Power Supply Transformer. If one of the readings is present and the other reading is missing check the power transformer windings. If both readings are present, check for 36.9V at both ends of Fuse (F2). If Fuse F2 is open, check zener diode ZD1, Diodes D1, D7, Electrolytics C22 and C26, regulator SR1 and associated components. If Fuse F2 is not open check for 24V at the cathode of Diode D7. If 24V is missing, check transistors Q25, Q24, Q23 and Q22, and IC3A and associated components. If the 24V is present, check for 5V at the cathode of Diode D1. If the 5V is missing check transistors Q21, Q20 and the 5 volt regulator (SR1) and associated components.

MICROCOMPUTER (CPU OPERATION)

Check waveforms at pins 30 and 31 of Microcomputer IC (2B). If waveforms are not correct, check crystal CR1 and capacitors C6 and C7. Check for a logic high at pin 28 of IC (2B). If logic is correct at pin 28 and waveforms are present at pins 30 and 31 of IC2B, check waveforms and logic readings associated with IC3B.

PAPER FEED MOTOR

If paper does not advance, check the resistance of the Paper Feed Motor (M2) windings, at pins 7 thru 12 of connector CN5, check for 60 ohms for each winding. Set printer in OFF line mode, press Form Feed and check for waveforms at pins 26 thru 29 of IC3B. If any of the waveforms are missing check IC3B by substitution. If waveforms are present check voltages and components associated with transistor Q18 and Driver Transistors Q12, Q13, Q16 and Q17. Check for 24V at the emitter of transistor Q18, and check for 23.5V at the Collector of Transistor Q18 when Form Feed button is pressed.

DIP SWITCH SETTINGS

DSW1-1 selects condensed characters when On and normal characters when Off.

DSW1-2 selects slashed zeros when On and unslashed zeros when Off.

DSW1-3 selects Graphic characters when On and Italic characters when Off. When DSW1-4 is set to On and DSW1-3 is set to Off a Carriage Return is added to Line Feed commands.

DSW1-4 selects IBM Printer Emulation mode when set to On.

DSW1-5 selects NLQ mode when On and Draft mode when Off.

DSW1-6, 7, 8 selects the International Character set.

CARRIAGE MOTOR

Carriage Motor Assembly does not move carriage assembly back and forth. Check operation of Home Position Sensor switch and the logic reading at pin 23 of IC3B. The logic reading should be low when the Print Head is in the Home position, and should change to high when the Print Head is away from Home position. Check the resistance of the carriage motor windings. Check for 40 ohms between pin 3 and pins 1 and 5 and between pin 4 and pins 2 and 6 of connector CN5. If resistance readings are different, check carriage motor by substitution. Set printer to self test and check waveforms at pins 4, 5, 6 and 7 of IC3B.

PRINTER WILL NOT RECEIVE DATA

Printer prints correctly in self test mode, but will not receive data from HOST computer. Press On Line button, On Line LED should turn On, check for a logic High at pin 8 of CPU IC (2B), check for logic low when the On line LED is OFF. If On line LED is ON command HOST computer to send information to printer. Check for strobe pulses at pin 46 of Interface IC (3B). If pulses are missing check resistors R62 and R63, Capacitor C27, Connector CN1 and Interface cable. If strobe pulses are present, check pin 36 of IC (3B) for busy pulses. If pulses are missing, check Interface IC (3B) by substitution. If pulses are present, check for ACK pulses at pin 22 of the microcomputer IC (2B). If ACK pulses are present, check Interface cable and connector CN1.

SELECT TYPE FEATURE

The printer selectType feature can produce four special type styles. Emphasized, double-strike, condensed and elite. To turn on SelectType, turn the printer On. While it is on lind hold down the ON/OFF line button and press the Form Feed button. A short beep will sound and the On Line light blinks to indicate that the printer is in SelectType mode.

In SelectType each button has a function. ON/OFF line selects type styles, Form Feed sets the styles, and Line Feed turns the SelectType OFF.

SWITCHES

	<u>DSW1-6</u>	<u>DSW1-7</u>	<u>DSW1-8</u>
USA	On	On	On
French	On	On	Off
German	On	Off	On
United Kingdom	On	Off	Off
Danish	Off	On	On
Swedish	Off	On	Off
Italian	Off	Off	On
Spanish	Off	Off	Off

DSW2-1 selects 12-inch page length when On and 11-inch page length when Off.

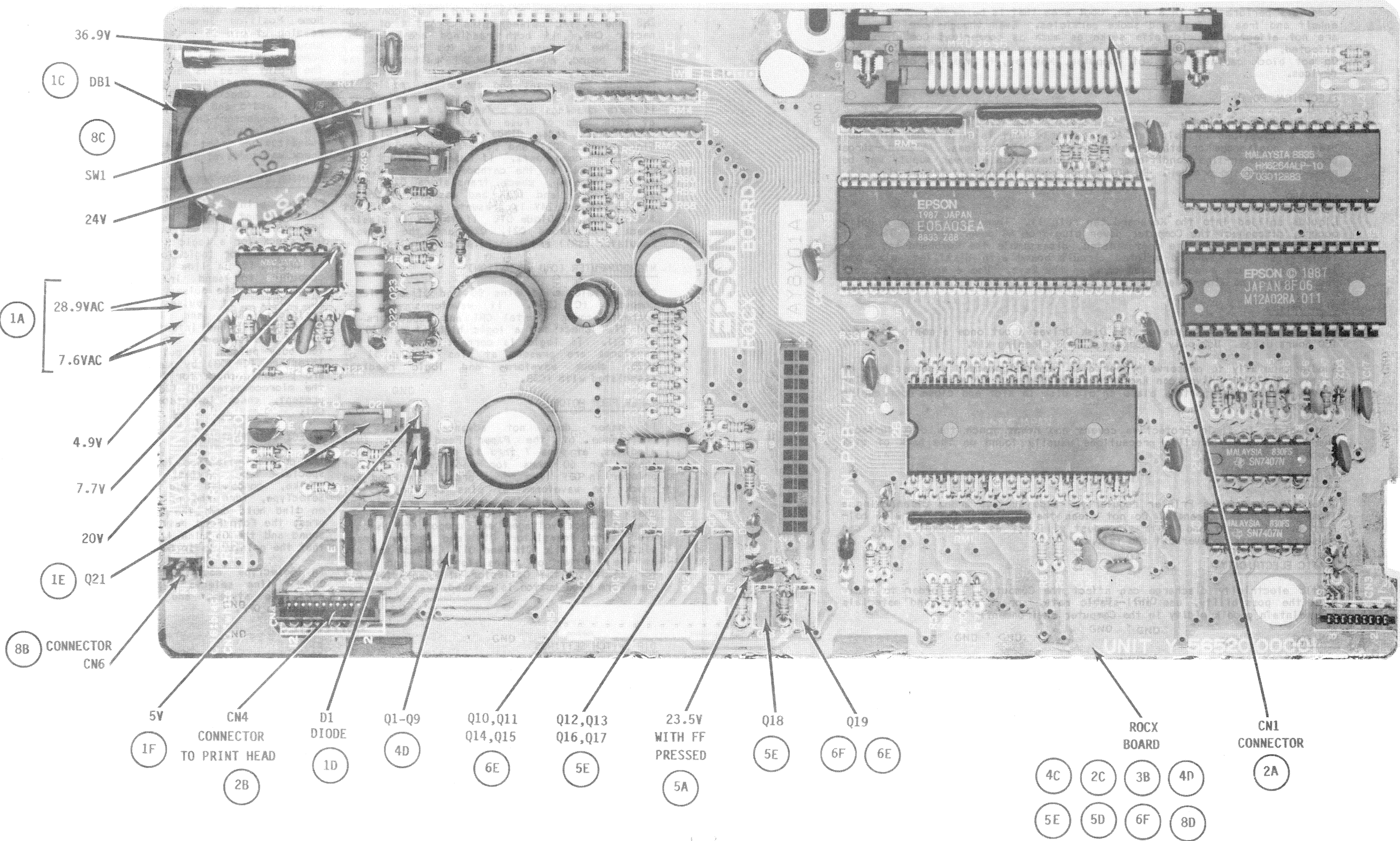
DSW2-2 selects Automatic Sheet Feeder mode when On.

DSW2-3 selects 1-inch Perforation Skip Over mode when On.

DSW2-4 adds a Line Feed after Carriage Return when On.

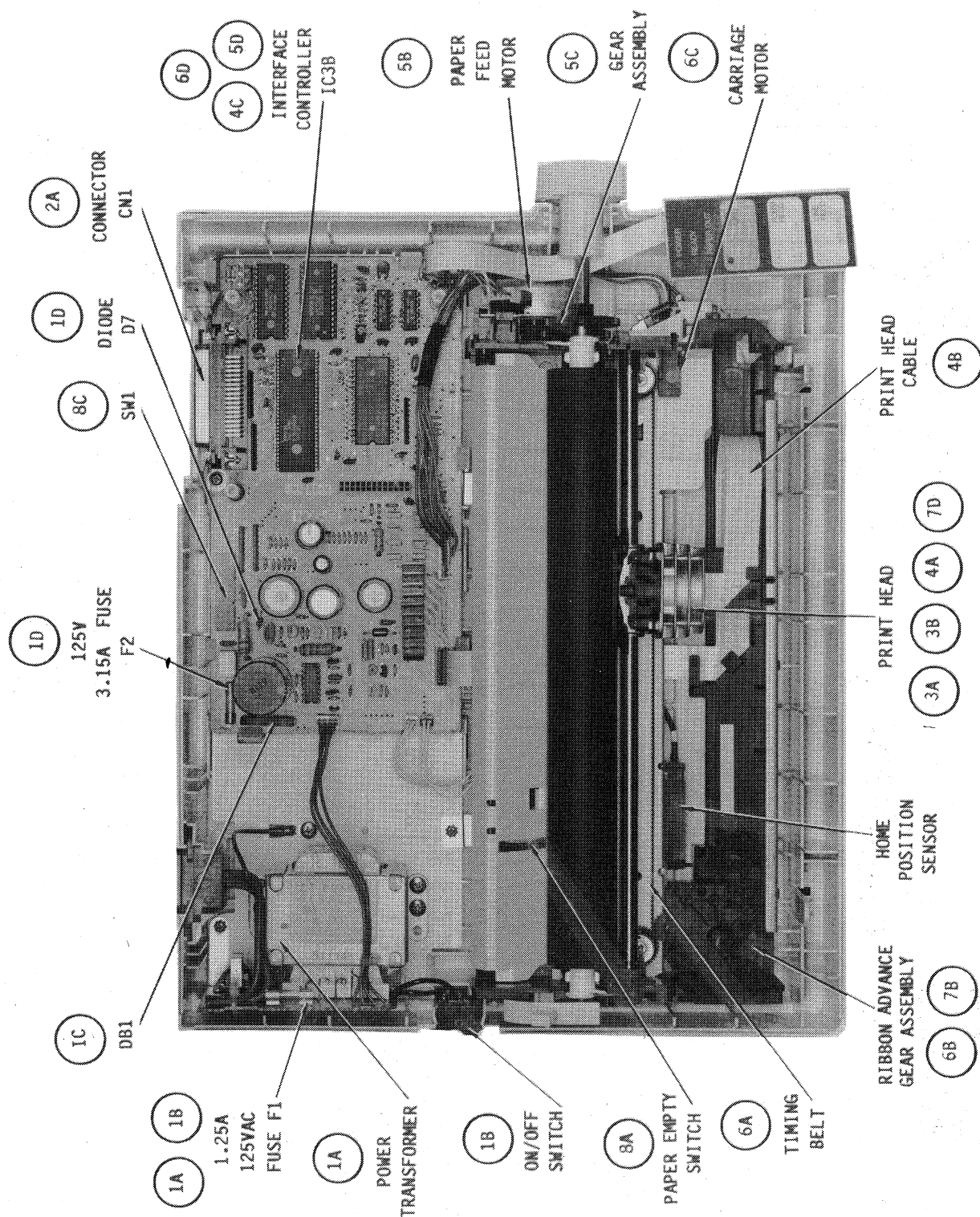
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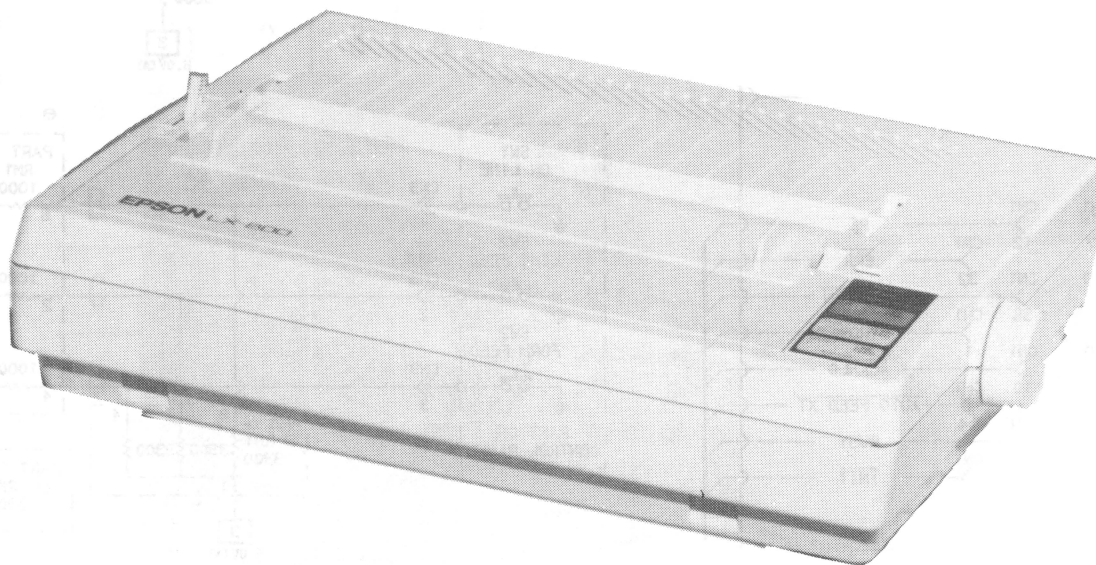


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PRELIMINARY SERVICE CHECKS (Continued)



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SAFETY PRECAUTIONS

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PRELIMINARY SERVICE CHECKS

ENCLOSED

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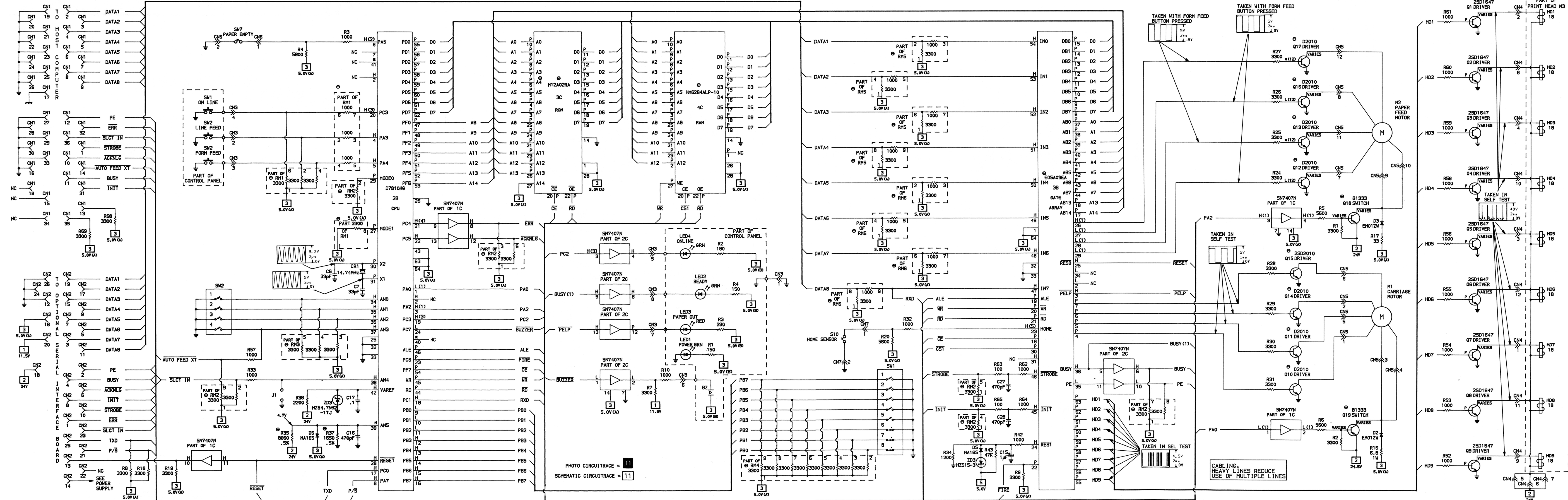
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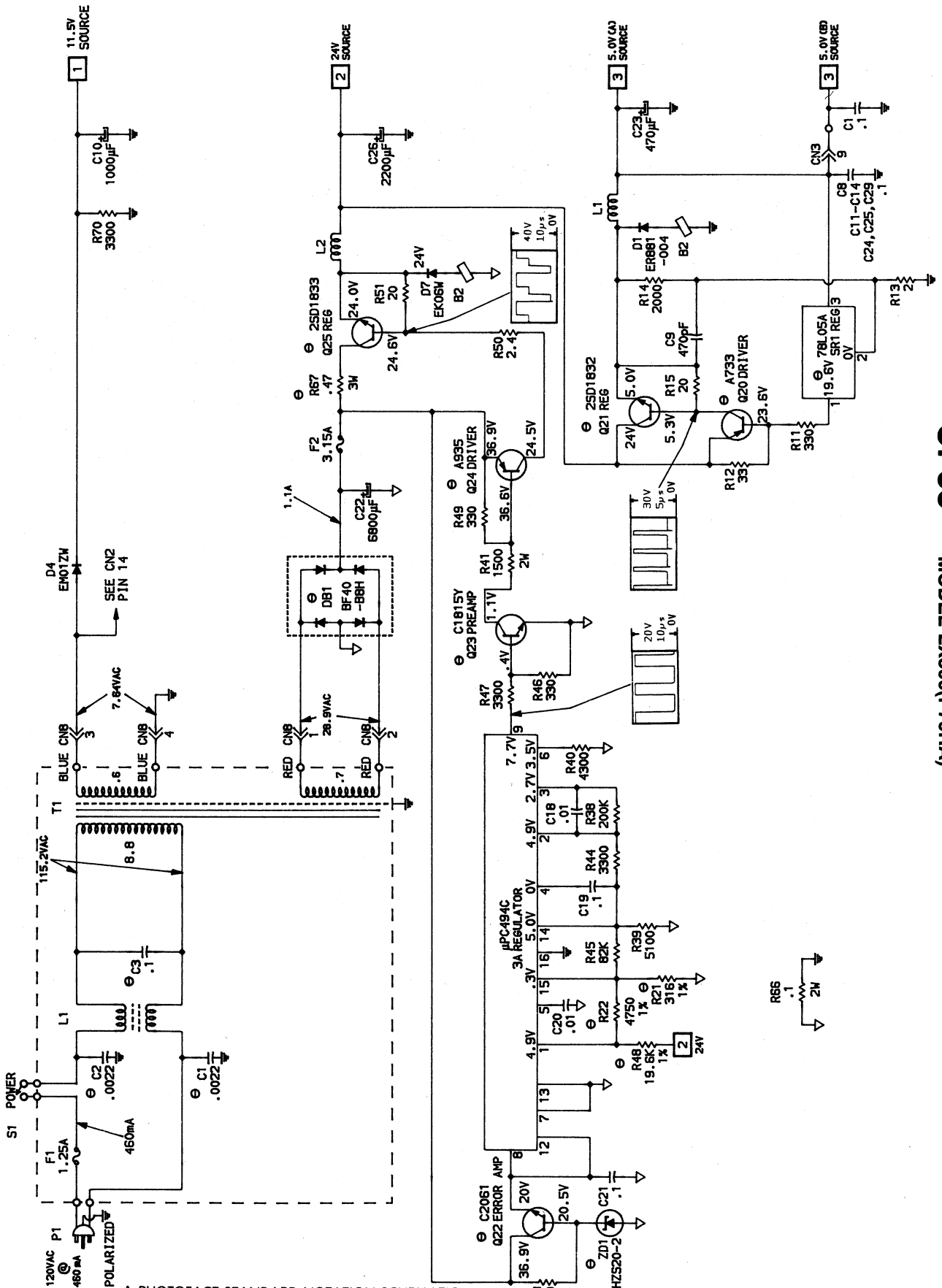
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A PHOTOFAC STANDARD NOTATION SCHEMATIC
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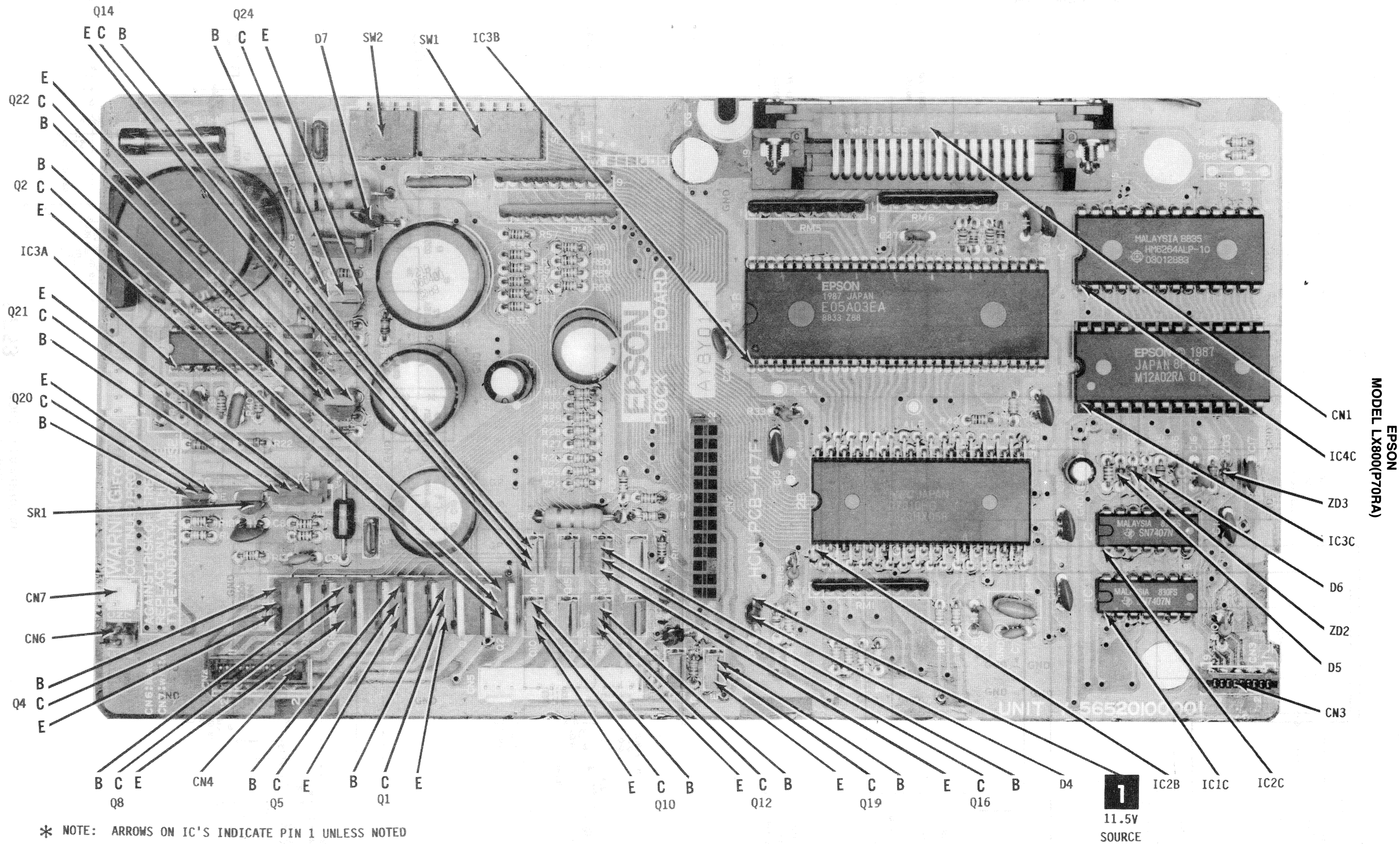
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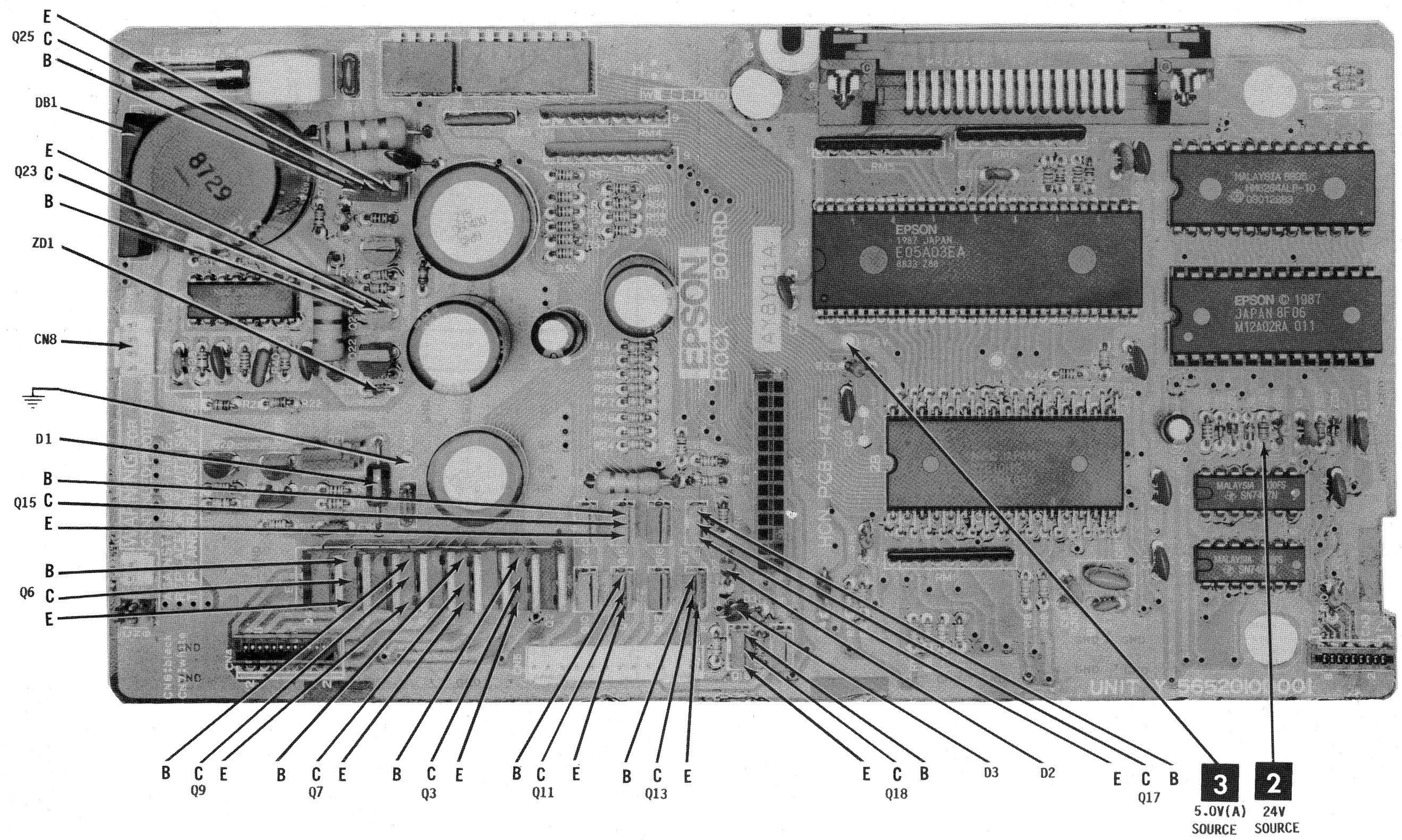
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EPSON MODEL LX800(P70RA)

POWER SUPPLY





DISASSEMBLY INSTRUCTIONS

UPPER CASE REMOVAL

Remove sheet guide, printer cover, tractor unit and paper guide. Insert a standard flat screwdriver into the two holes at the front of the lower case. Unlock the upper case guides by pushing them towards the front using the edge of the screwdriver. When notches are unlocked remove the upper case. Disconnect the flexible cable of the control panel from connector CN3 on the ROCX board and remove upper case.

CONTROL PANEL REMOVAL

Remove upper case, turn upper case over and push in the two notches securing the control panel to upper case. Remove control panel from upper case.

MAIN BOARD ROCX REMOVAL

Remove upper case and disconnect connectors CN5, CN4, CN6, CN7 and CN8 on ROCX board. Remove one screw securing ROCX board to base plate. Loosen six bent tabs for the lower case that secure the ROCX main board to the lower case. Remove the ROCX board.

POWER FILTER UNIT REMOVAL (ROC)

Remove the upper case, disconnect the cable connecting the ROC Filter unit to the ROCX board from connector CN8 on the ROCX board. Remove five screws securing the ROC Filter unit to base plate. Remove ROC Filter unit including AC cable and Power Switch.

PRINthead REMOVAL

Remove printer cover and confirm that the paper and ribbon cartridge have been removed. Unlock two levers securing print head to carriage. Lift print head to remove it and pull out Head cable.

PRINTER MECHANISM REMOVAL

Remove upper case, remove platen unit and paper guide by turning shaft holders at the left and at the right up, and lift platen unit and remove it. Disconnect cable from connector CN6 on ROCX board. Unlock the two notches of paper guide one on each end, push the two notches towards the front and remove the paper guide. Disconnect cables from connectors CN4, CN5 and CN7 on ROCX board. Loosen six tabs for lower case securing printer mechanism, loosen two tabs on the left side and lift the left side up about 1cm, then loosen the tab on the back of the mechanism towards the right half, then lift the left side a little more. Slide the mechanism towards the left and towards the back. Remove printer mechanism from lower case of the printer.

PAPER FEED MOTOR REMOVAL

Remove printer mechanism, disconnect motor cable from paper-feed motor. Using a screwdriver loosen tab that secures paper-feed motor and turn motor assembly counterclockwise. Remove paper-feed motor.

PAPER END SENSOR REMOVAL

Loosen tab securing paper end sensor. Pull paper end-sensor towards the back. Disconnect CN6 connector from ROCX board. Remove paper-end sensor.

CARRIAGE MOTOR REMOVAL

Remove printer mechanism, remove print head and disconnect head cable. Turn printer mechanism over, move carriage unit over to the cutout opening in the carriage motor frame. Detach timing belt from carriage unit using round end long nose pliers, careful not to damage belt. Remove carriage guide shaft ground plate, slide the plate and lift out of the frame. Disconnect motor cable from carriage motor. Loosen four tabs securing carriage motor frame to chassis frame. Remove belt tension spring from carriage motor frame. Remove E-type retaining ring on carriage motor side, then remove plain washer, belt pulley flange, belt pulley shaft holder and belt pulley. Move carriage motor counterclockwise and remove it. See Figure 1.

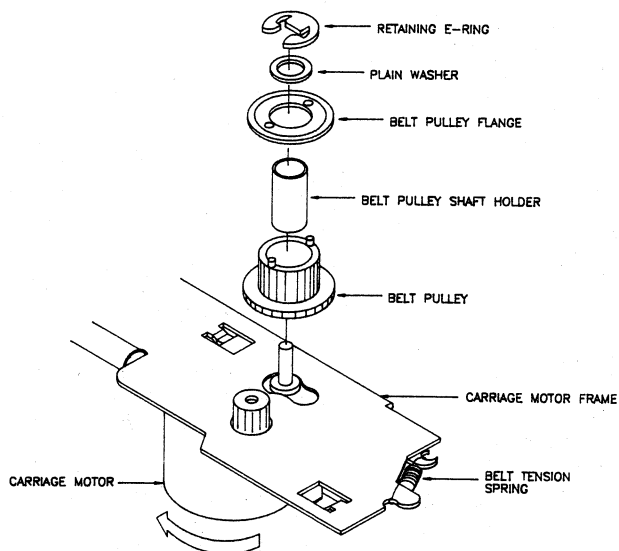


Figure 1

HOME-POSITION SENSOR REMOVAL

Remove carriage motor frame, (see Carriage Motor Removal). Push in the notch of home-position sensor and remove home-position sensor from carriage motor frame.

RIBBON-FEED MECHANISM REMOVAL

Remove printer mechanism, turn printer mechanism over. Loosen tabs for ribbon gear cover while holding cover in place. Place printer mechanism face up and lift ribbon gear cover to remove it.

GENERAL OPERATING INSTRUCTIONS

SELF TEST

Press LINE FEED button while turning power ON. The printer should go into self test mode printing DRAFT. If the FORM FEED button is pressed the printer will print the self test pattern in near letter quality.

BUZZER AND ERROR FUNCTIONS

The buzzer rings under the following cases:

1. When a BEL code is sent to the printer the buzzer rings once. (for 0.1 sec)

2. When the NLQ Roman font is set using the NLQ/FORMFEED Switch, the buzzer rings twice (for 0.1 sec each)

3. When the NLQ Sans serif font is set using the NLQ/FORMFEED Switch, the buzzer rings three times (for 0.1 sec each)

4. When paper out is detected the buzzer rings eight times (for 0.5 sec each)

5. When hardware error is detected the buzzer rings five times (for 0.5 sec each)

MISCELLANEOUS ADJUSTMENTS

PRINT HEAD PLATEN GAP ADJUSTMENT

Perform this adjustment when the carriage guide shaft or shaft levers are rotated or removed or the printing is abnormal. Remove printer mechanism, remove print head and remove ribbon mask by pulling it forward and lifting up. Reinstall the print head and install the paper guide and the platen unit on the printer mechanism. Set the head adjust lever at the position nearest the platen. Manually, move the carriage to the paper end sensor lever position. Insert a thickness gauge 0.47mm between the platen and the print head. Adjust the left and right carriage guide shaft lever so that the gap becomes 0.47 ± 0.02 mm. Perform the above adjustment at the 10th and 70th column positions and at the middle of the platen. When gaps at all three positions are the same the adjustment is complete.

TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

Equipment	B & K Precision Equipment No.	Sencore Equipment No.	Notes
OSCILLOSCOPE	1570A,1590A,1596	SC61	
LOGIC PROBE	DP51,DP21		
LOGIC PULSER	DP101,DP31		
DIGITAL VOM	2830,2806	DVM37,DVM56,SC61	
ANALOG VOM	277,111,116		
ISOLATION TRANSFORMER	TR110,1604,1653,1655	PR57	
FREQUENCY COUNTER	1803,1805	FC71,SC61	
COLOR BAR GENERATOR	1211A,1251,1260,1249	CG25,VA62	
RGB GENERATOR	1260,1249		
FUNCTION GENERATOR	3020,3011,3030		
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44 PR-28(HV)	HP200	
TEMPERATURE PROBE	TP-28,TP-30		
CRT ANALYZER	467,470	CR70	
DIGITAL IC TESTER	560,550,552		
CAPACITANCE ANALYZER		LC53,LC75,LC76 LC77	
INDUCTANCE ANALYZER		LC53,LC75,LC76 LC77	

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TROUBLESHOOTING

PRINTER DEAD

Connect 120VAC and turn power switch ON, check for 29VAC between pins 1 and 2 of connector CN8 and 7.7VAC between pins 3 and 4 of connector CN8. If both readings are missing, check the AC Fuse (F1) on the Power Supply Filter board, AC cord, ON/OFF switch and the Power Supply Transformer. If one of the readings is present and the other reading is missing check the power transformer windings. If both readings are present, check for 36.9V at both ends of Fuse (F2). If Fuse F2 is open, check zener diode ZD1, Diodes D1, D7, Electrolytics C22 and C26, regulator SR1 and associated components. If Fuse F2 is not open check for 24V at the cathode of Diode D7. If 24V is missing, check transistors Q25, Q24, Q23 and Q22, and IC3A and associated components. If the 24V is present, check for 5V at the cathode of Diode D1. If the 5V is missing check transistors Q21, Q20 and the 5 volt regulator (SR1) and associated components.

MICROCOMPUTER (CPU OPERATION)

Check waveforms at pins 30 and 31 of Microcomputer IC (2B). If waveforms are not correct, check crystal CR1 and capacitors C6 and C7. Check for a logic high at pin 28 of IC (2B). If logic is correct at pin 28 and waveforms are present at pins 30 and 31 of IC2B, check waveforms and logic readings associated with IC3B.

PAPER FEED MOTOR

If paper does not advance, check the resistance of the Paper Feed Motor (M2) windings, at pins 7 thru 12 of connector CN5, check for 60 ohms for each winding. Set printer in OFF line mode, press Form Feed and check for waveforms at pins 26 thru 29 of IC3B. If any of the waveforms are missing check IC3B by substitution. If waveforms are present check voltages and components associated with transistor Q18 and Driver Transistors Q12, Q13, Q16 and Q17. Check for 24V at the emitter of transistor Q18, and check for 23.5V at the Collector of Transistor Q18 when Form Feed button is pressed.

CARRIAGE MOTOR

Carriage Motor Assembly does not move carriage assembly back and forth. Check operation of Home Position Sensor switch and the logic reading at pin 23 of IC3B. The logic reading should be low when the Print Head is in the Home position, and should change to high when the Print Head is away from Home position. Check the resistance of the carriage motor windings. Check for 40 ohms between pin 3 and pins 1 and 5 and between pin 4 and pins 2 and 6 of connector CN5. If resistance readings are different, check carriage motor by substitution. Set printer to self test and check waveforms at pins 4, 5, 6 and 7 of IC3B.

PRINTER WILL NOT RECEIVE DATA

Printer prints correctly in self test mode, but will not receive data from HOST computer. Press On Line button, On Line LED should turn On, check for a logic High at pin 8 of CPU IC (2B), check for logic low when the On line LED is OFF. If On line LED is ON command HOST computer to send information to printer. Check for strobe pulses at pin 46 of Interface IC (3B). If pulses are missing check resistors R62 and R63, Capacitor C27, Connector CN1 and Interface cable. If strobe pulses are present, check pin 36 of IC (3B) for busy pulses. If pulses are missing, check Interface IC (3B) by substitution. If pulses are present, check for ACK pulses at pin 22 of the microcomputer IC (2B). If ACK pulses are present, check Interface cable and connector CN1.

SELECT TYPE FEATURE

The printer selectType feature can produce four special type styles. Emphasized, double-strike, condensed and elite. To turn on SelectType, turn the printer On. While it is on lInd hold down the ON/OFF line button and press the Form Feed button. A short beep will sound and the On Line light blinks to indicate that the printer is in SelectType mode.

In SelectType each button has a function. ON/OFF line selects type styles, Form Feed sets the styles, and Line Feed turns the SelectType OFF.

SWITCHES

DIP SWITCH SETTINGS

DSW1-1 selects condensed characters when On and normal characters when Off.

DSW1-2 selects slashed zeros when On and unslashed zeros when Off.

DSW1-3 selects Graphic characters when On and Italic characters when Off. When DSW1-4 is set to On and DSW1-3 is set to Off a Carriage Return is added to Line Feed commands.

DSW1-4 selects IBM Printer Emulation mode when set to On.

DSW1-5 selects NLQ mode when On and Draft mode when Off.

DSW1-6, 7, 8 selects the International Character set.

	DSW1-6	DSW1-7	DSW1-8
USA	On	On	On
French	On	On	Off
German	On	Off	On
United Kingdom	On	Off	Off
Danish	Off	On	On
Swedish	Off	On	Off
Italian	Off	Off	On
Spanish	Off	Off	Off

DSW2-1 selects 12-inch page length when On and 11-inch page length when Off.

DSW2-2 selects Automatic Sheet Feeder mode when On.

DSW2-3 selects 1-Inch Perforation Skip Over mode when On.

DSW2-4 adds a Line Feed after Carriage Return when On.

PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	ZENITH PART No.	NOTES
1C	SN7407N 7407 X420100070	NTE7407 NTE7407 NTE7407	ECG7407 ECG7407 ECG7407	SK7407 SK7407 SK7407	HE-443-1020 HE-443-1020 HE-443-1020	
2B	D7810HG 7810H UPD7810 [uPD7810] UPD7811 [uPD7811] UPD7810HG [uPD7810HG] X400078101					
2C	SN7407N 7407 X420100070	NTE7407 NTE7407 NTE7407	ECG7407 ECG7407 ECG7407	SK7407 SK7407 SK7407	HE-443-1020 HE-443-1020 HE-443-1020	
3A	UPC494C [uPC494C] X440064940	NTE1729 NTE1729	ECG1729 ECG1729			
3B	E05A03EA E05A03BA E05A03CA E05A03 Y448800001					
3C	M12A02RA 27256 27128	NTE21128				
4C	HM6264ALP-10 2064(1C) 2064C UPD4364C [uPD4364C] X400143644					

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6 PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	ZENITH PART No.	NOTES
D1 D2,3,4 D5,6	ER881-004 EM01ZW MA165	NTE519	ECG519	SK3100/519	103-131	
D7 DB1	EK06W BF4088H D3SB10	NTE5309 NTE5309	ECG5309 ECG5309	SK5028/5309 SK5028/5309		
Q1 THRU Q9	D1647 2SD1647 C3293 2SD1647C3 X302164709	NTE2332	ECG2332			
Q10 THRU Q17	D2010 D1843 B1333 B1093					
Q18						
Q19	B1333 B1318 A733 A1015					
Q20		NTE290A NTE290A	ECG290A ECG290A	SK3114A/290A SK9132	121-Z9003 121-Z9003	*
Q21	D1832 2SD1832 C3746 2SD1832C4 X302183209					*
Q22	C2061 C1384	NTE297 NTE293	ECG297 ECG293	SK3449/297 SK3849/293	921-340 121-Z9066	*
Q23	C1815Y C1815	NTE85 NTE85	ECG85 ECG85	SK3124A/289A SK3124A/289A	121-Z9065 121-Z9065	*
Q24	A935	NTE298	ECG298	SK3450/298	121-Z9103	*

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.					NOTES
		NTE PART No.	ECG PART No.	TCE PART No.	ZENITH PART No.	
Q25	D1833 2SD1833 C3747 2SD1833C4 X302183309					
SR1	78L05A UPC78L05J 1UPC78L05J1 X440078054	NTE977 NTE977 NTE977	ECG977 ECG977 ECG977	SK3462/977 SK3462/977 SK3462/977	221-Z9044 221-Z9044 221-Z9044	
ZD1	HZS20-2 HZS20-2TD X330160309					
ZD2	HZS15-3 HZS15-3TD X330160209					
ZD3	HZS4.7NB2-1TJ X330160109	NTE5009A NTE5009A	ECG5009A ECG5009A	SK4A7/5009A SK4A7/5009A	103-279-09 103-279-09	

* Lead configuration may vary from original.

WIRING DATA

Shielded Hook-up Wire	Use BELDEN No. 8401 or 8421 (Single-Conductor)
General-use Unshielded Hook-up Wire	8208 (Two-Conductor)
	8529 (Solid) Available in 13 Colors
	8522 (Stranded) Available in 13 Colors

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PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

CAPACITORS

ITEM No.	RATING	MFGR. PART No.
<u>POWER SUPPLY</u>		
C1	.0022 125VAC 20%	
C2	.0022 125VAC 20%	
C3	.1 250VAC	

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	
<u>MAIN BOARD</u>				
R21	316 1% 1/8W Carbon Film			
R22	4750 1% 1/8W Carbon Film			
R35	8060 .5% 1/8W Carbon Film			
R37	1650 .5% 1/8W Carbon Film			
R48	19.6K 1% 1/8W Carbon Film			
R67	.47 5% 3W WW			
RM1	Resistor Network	(1)		
RM2	Resistor Network	(2)		
RM3	Resistor Network	(3)		
RM4	Resistor Network	(2)		
RM5	Resistor Network	(4)		
RM6	Resistor Network	(4)		

(1) 1000 5% X 3, 3300 5% X 5

(2) 3300 5% X 8

(3) 3300 5% X 3

(4) 1000 5% X 4, 3300 5% X 4

FUSE DEVICES

ITEM NO.	DESCRIPTION	MFGR. PART NO.		NOTES
		DEVICE	HOLDER	
<u>POWER SUPPLY</u>				
F1	1.25Amp @ 125VAC Fast Acting			
<u>MAIN BOARD</u>				
F2	3.15A @ 125VDC Fast Acting			

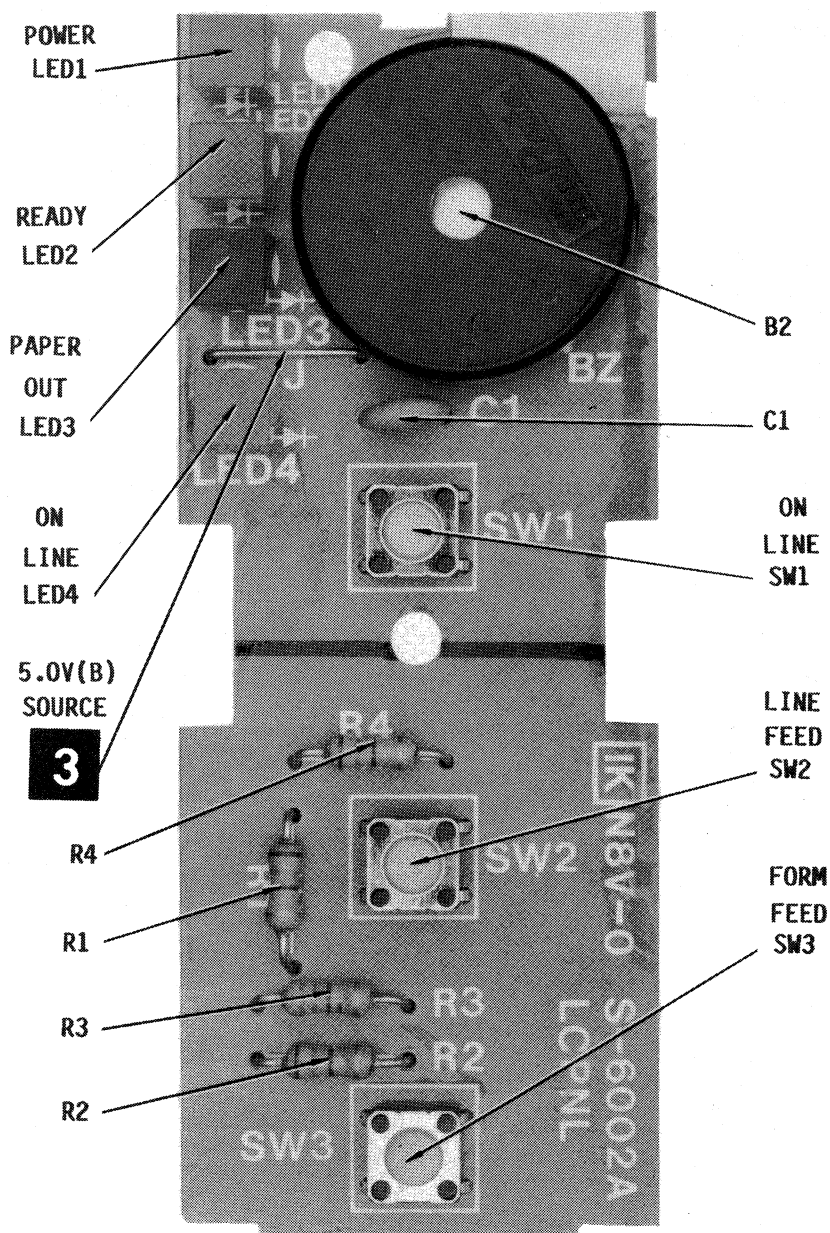
For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
	Carriage Motor	F333051010	M1
	Filter Unit	Y565503000	ROC
	Head Cable	F333003080	
	Home Position Sensor	F333053000	
	Paper End Sensor	F333252000	
	Paper Feed Motor	F333003110	M2
	PC Board	Y565501000	LCPNL (Control)
	PC Board	Y565201000	ROCX (Main)
	Printer Mechanism	Y565590000	Model 3A10
	Print Head	F420100000	M3
	Timing Belt	F333051020	



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SAFETY PRECAUTIONS

1. Use an isolation transformer for servicing.
2. Maintain AC line voltage at rated input.
3. Remove AC power from the Printer before servicing or installing electrostatically sensitive devices. Examples of typical ES devices are integrated circuits and semiconductor "chip" components.
4. Use extreme caution when handling the printed circuit boards. Some semiconductor devices can be damaged easily by static electricity. Drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available discharging wrist strap device. This should be removed prior to applying power to the unit under test.
5. Use a grounded-tip, low voltage soldering iron.
6. Use an isolation (times 10) probe on scope.
7. Do not remove or install board, mechanical or electrical parts or other peripherals with Printer AC power On.
8. Do not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. This Printer is equipped with a grounded three-pronged AC plug. This plug must fit into a grounded AC power outlet. Do not defeat the AC plug safety feature.
10. Periodically examine the AC power cord for damaged or cracked insulation.
11. The Printer cabinet is equipped with vents to prevent heat build-up. Never block, cover or obstruct these vents.
12. Instructions should be given, especially to children, that objects should not be dropped or pushed into the vents of the cabinet. This could cause shock or equipment damage.
13. Never expose the Printer to water. If exposed to water, turn the unit Off. Do not place the Printer near possible water sources.
14. Never leave the Printer unattended or plugged into the AC outlet for long periods of time. Remove AC plug from AC outlet during lightning storms.
15. Do not allow anything to rest on AC power cord.
16. Unplug AC power cord from outlet before cleaning Printer.
17. Never use liquids or aerosols directly on the Printer. Spray on cloth and then apply to the Printer cabinet. Make sure the Printer is disconnected from the AC power line.

SCHEMATIC NOTES

▽ Isolated ground

—X Circuitry not used in some versions

--- Circuitry used in some versions

• See parts list

± Ground

Voltages measured with digital meter.

Waveforms and voltages taken from ground, unless noted otherwise.

All measurements taken with Printer in Draft Self-Test mode unless noted.

Supply voltage maintained as shown at input.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

Capacitors are 50 volts or less, 5% unless noted.

Electrolytic capacitors are 50 volts or less, 20% unless noted.

Resistors are 1/2W or less, 5% unless noted.

Value in () used in some versions.

Measurements with switching as shown, less noted.

Logic Probe Display

L = Low

H = High

P = Pulse

* = Open (No Lights On)

1. Pulse w/LF.

2. Low when no paper is loaded.

3. Low when printer is On/Line.

4. Low when error occurs.

5. Low at Home Position.

LOGIC CHART

PIN NO.	IC 1C	PIN NO.	IC 2B	PIN NO.	IC 2B	PIN NO.	IC 2B	PIN NO.	IC 2B	PIN NO.	IC 2B	PIN NO.	IC 2C
1	L(1)	1	L(1)	21	H(4)	41	*	61	P	1	L		
2	L(1)	2	H	22	H	42	H	62	P	2	L		
3	H(1)	3	H(1)	23	P	43	H	63	H	3	H		
4	H(1)	4	H	24	L	44	P	64	H	4	H		
5	L	5	H	25	L	45	P			5	H		
6	L	6	H(2)	26	L	46	P			6	H		
7	L	7	*	27	P	47	P			7	L		
8	H	8	H	28	H	48	P			8	H		
9	H((4)	9	L	29	P	49	P			9	H		
10	H	10	L	30	P	50	P			10	L		
11	H	11	L	31	P	51	P			11	L		
12	H	12	H	32	L	52	P			12	P		
13	H	13	H	33	L	53	P			13	H		
14	H	14	H	34	H	54	P			14	H		
		15	H	35	H	55	P						
		16	H	36	H	56	P						
		17	H	37	H	57	P						
		18	H	38	H	58	P						
		19	H(3)	39	H	59	P						
		20	H(3)	40	*	60	P						

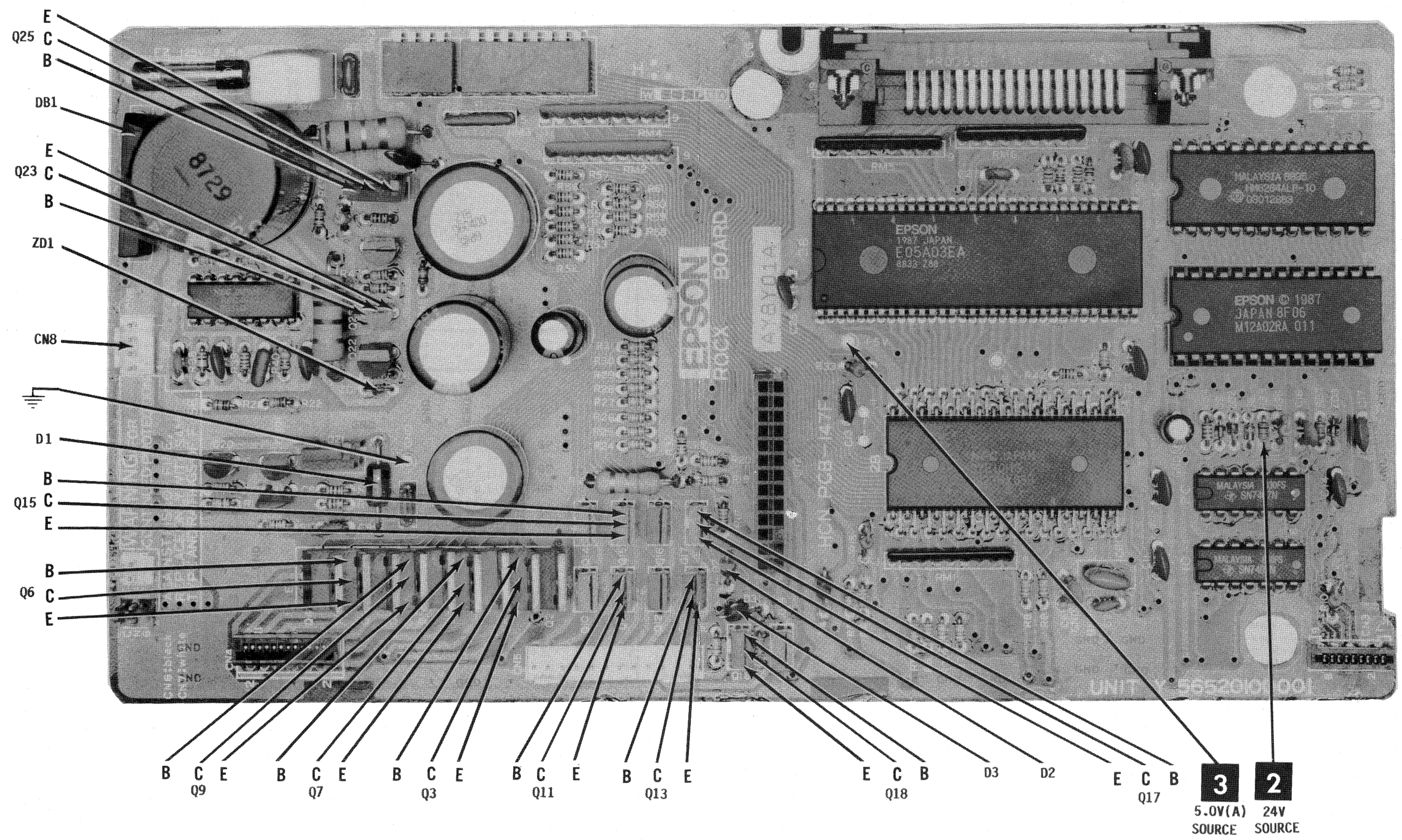
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1	H	21	P	41	P	61	P	1	H	21	P	1	P	21	P
2	L	22	P	42	P	62	P	2	P	22	P	2	P	22	P
3	H	23	H(5)	43	P	63	P	3	P	23	P	3	P	23	P
4	P	24	H	44	P	64	H	4	P	24	P	4	P	24	P
5	P	25	H	45	H			5	P	25	P	5	P	25	P
6	P	26	H(1)	46	H			6	P	26	P	6	P	26	H
7	P	27	L(1)	47	H			7	P	27	H	7	P	27	P
8	P	28	H(1)	48	H			8	P	28	H	8	P	28	H
9	P	29	L(1)	49	H			9	P			9	P		
10	P	30	P	50	H			10	P			10	P		
11	P	31	P	51	H			11	P			11	P		
12	P	32	L	52	H			12	P			12	P		
13	P	33	L	53	H			13	P			13	P		
14	P	34	L	54	H			14	L			14	L		
15	P	35	L	55	P			15	P			15	P		
16	P	36	H	56	P			16	P			16	P		
17	P	37	P	57	P			17	P			17	P		
18	P	38	P	58	P			18	P			18	P		
19	P	39	P	59	P			19	P			19	P		
20	P	40	P	60	P			20	P			20	P		

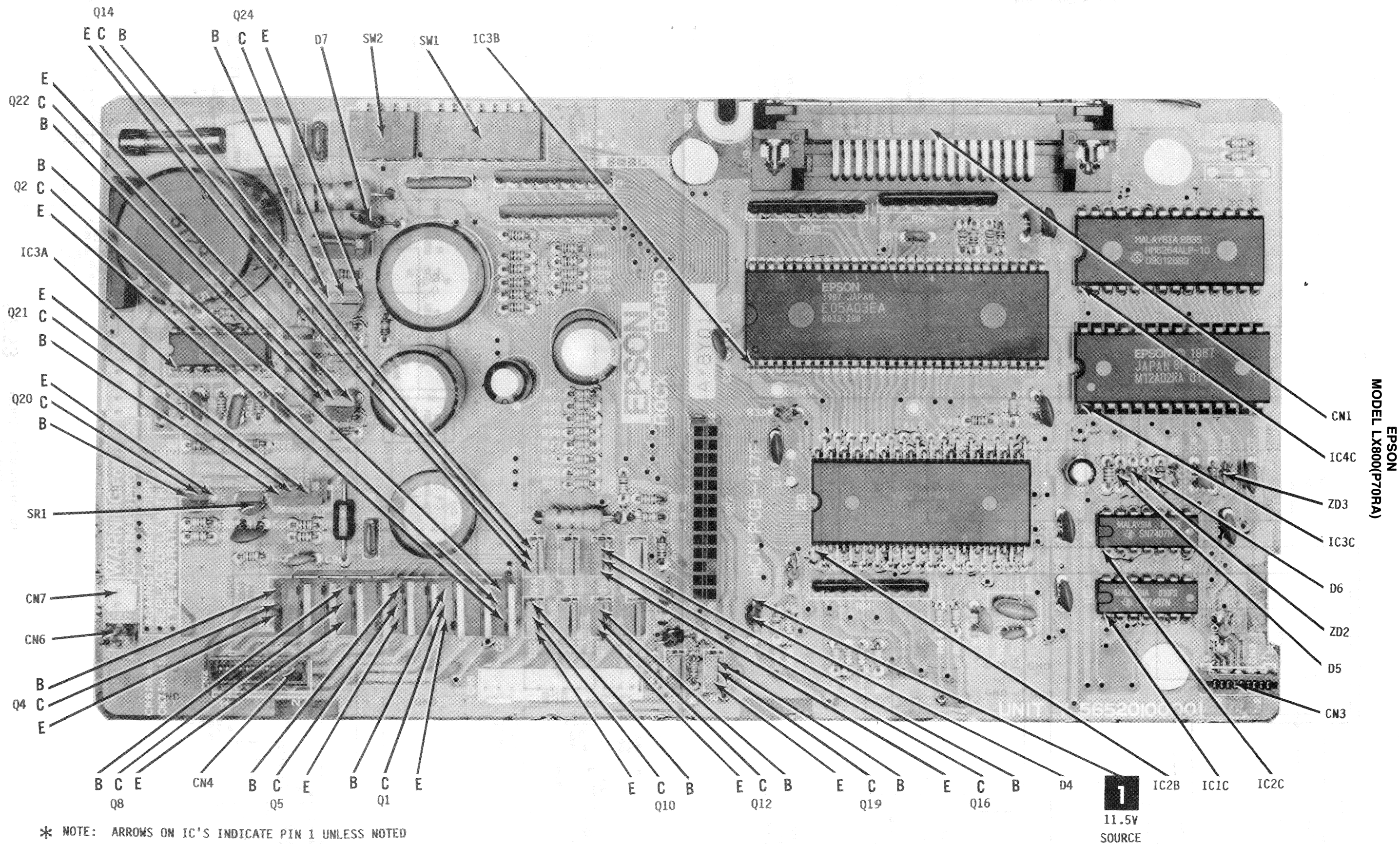
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LINE DEFINITIONS

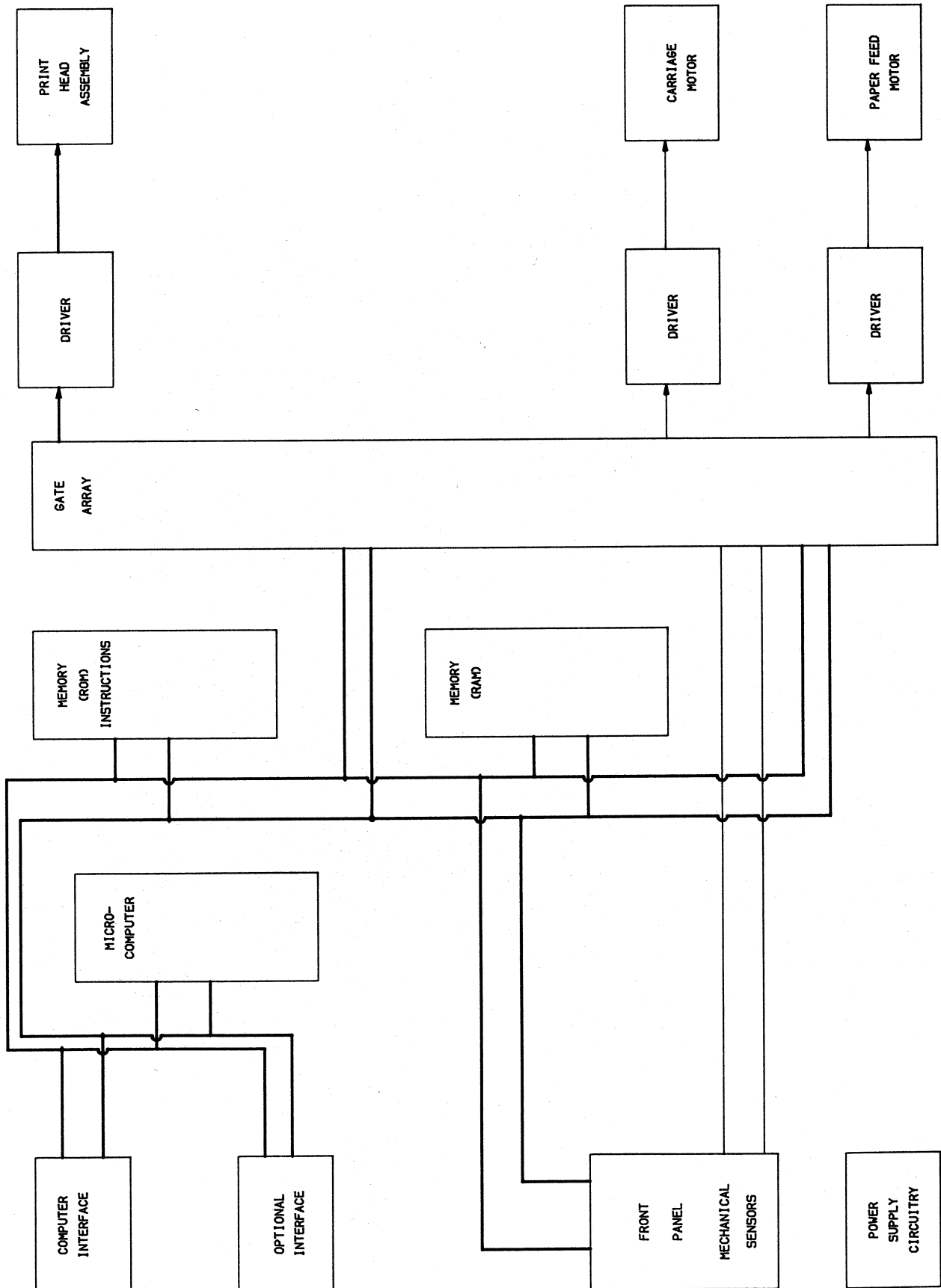
A0 THRU A14 Address Bits 0 Thru 14
ACKNLG Acknowledge Data Received At Printer
ALE Address Latch Enable
AUTO FEED XT Automatic Paper Feed, External
BUSY Busy, Off Line, Data Entry, Paper Feed, Printing
BUZZER Buzzer Actuation
CE Chip Enable, ROM Memory
CS1 Chip Select Line 1
D0 THRU D7 Data Bits 0 Thru 7
DATA 1 THRU DATA 8 Data Bits 1 Thru 8, Parallel
ERR Error, Off-Line, Paper End, Motor Problems
FIRE Print Head Solenoid Drive Pulse
HD1 THRU HD9 Print Head Driving Pulses
INIT Initialize, Printer Memory Cleared

P/S Parallel/Serial Select
PA0, PA2 Port A, Bits 0, 2
PB0 THRU PB7 Port B, Bits 0 Thru 7
PC2 Port C, Bit 2, Line Feed Motor Enable
PE Paper Empty Sensor
PE LP Paper Empty Lamp
RD Read Data
RESET Reset
RXD Received Data, Acknowledge
SLCT IN Select Input, Enables Printing Control Conditions
STROBE Strobe Pulse For Read In Data
TXD Transmitted Data
WR Write, Data Bus Info Stored In Memory Or I/O





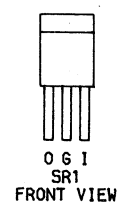
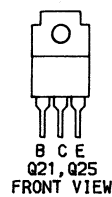
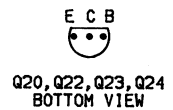
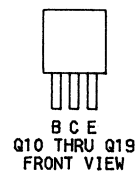
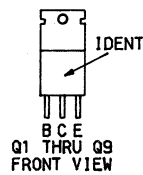
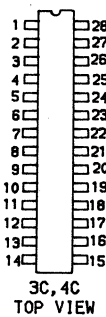
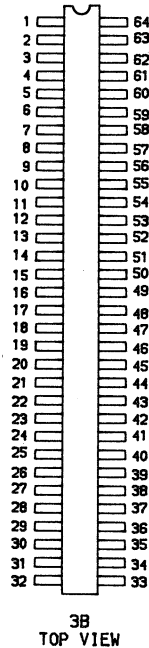
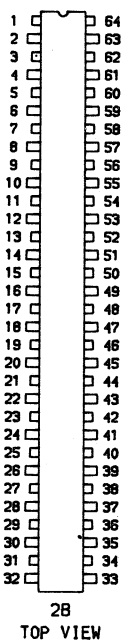
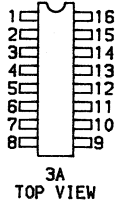
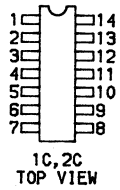
BLOCK DIAGRAM

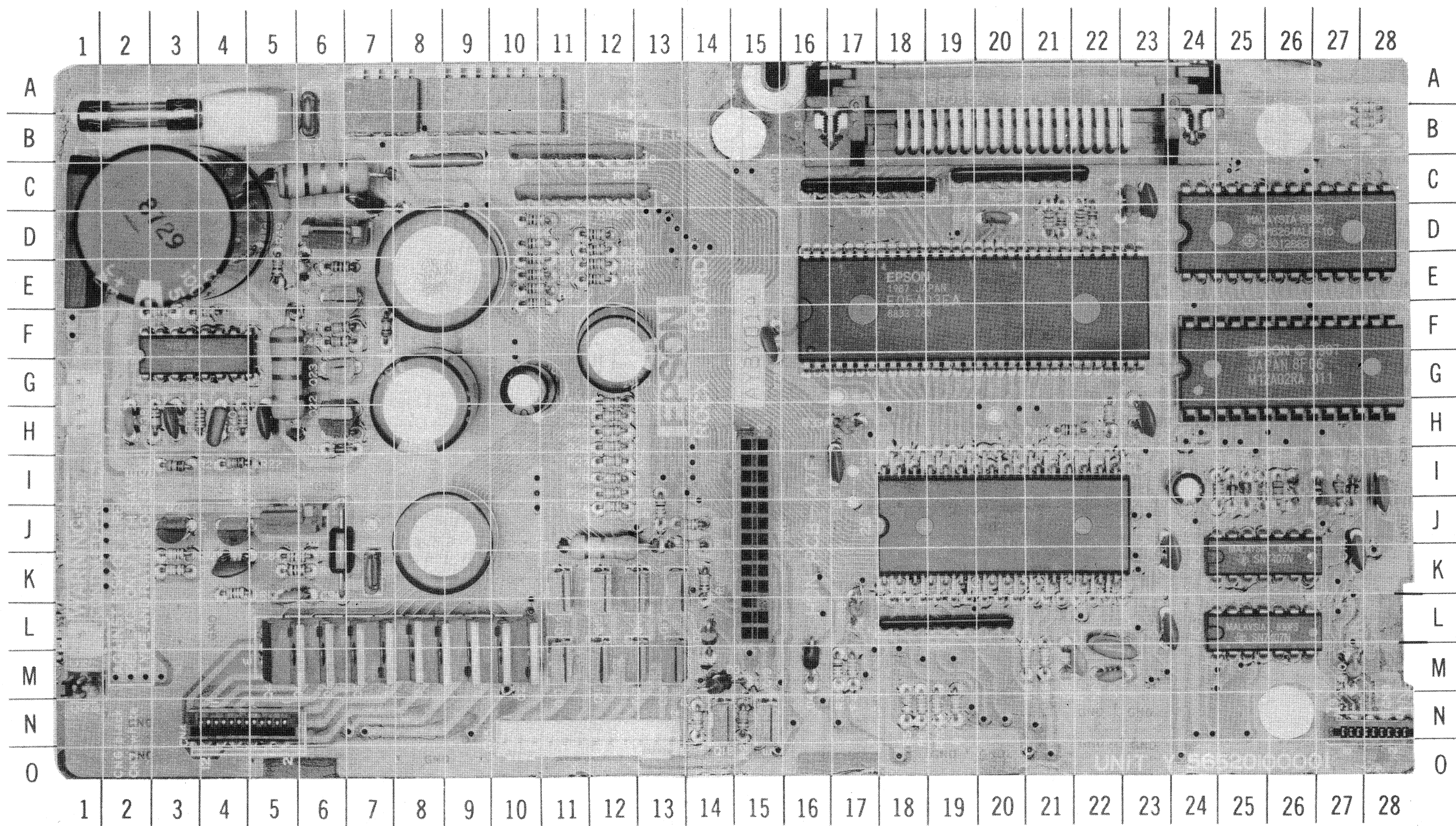


GridTrace LOCATION GUIDE

B1	K-7	CN8	G-1	Q19	N-15	R26	I-12	R58	E-12
B2	A-6	CR1	M-22	Q20	J-3	R27	I-12	R59	E-12
C6	M-22	D1	J-6	Q21	J-5	R28	H-12	R60	D-12
C7	M-22	D2	L-14	Q22	H-6	R29	H-12	R61	D-12
C8	K-4	D3	M-14	Q23	G-6	R30	H-12	R62	D-21
C9	K-5	D4	M-16	Q24	E-6	R31	G-12	R63	D-21
C10	G-12	D5	I-25	Q25	D-6	R32	J-13	R64	D-22
C11	L-24	D6	I-25	R1	N-14	R33	H-17	R65	D-22
C12	K-24	D7	C-7	R2	N-15	R34	I-25	R66	C-6
C13	I-17	DB1	C-1	R3	M-17	R35	I-26	R67	B-4
C14	K-27	F2	B-2	R4	M-17	R36	I-26	R68	B-28
C15	I-24	J1	I-17	R5	N-18	R37	I-27	R69	B-28
C16	I-27	L1	J-8	R6	N-18	R38	H-3	R70	N-19
C17	J-28	L2	E-8	R7	N-19	R39	H-3	RM1	L-18
C18	H-2	Q1	M-8	R8	M-21	R40	H-4	RM2	C-11
C19	H-3	Q2	M-10	R9	M-21	R41	G-5	RM3	B-9
C20	H-4	Q3	M-10	R10	M-27	R42	H-21	RM4	B-12
C21	H-5	Q4	M-5	R11	K-3	R43	H-22	RM5	C-17
C22	D-3	Q5	M-7	R12	K-3	R44	F-3	RM6	C-20
C23	G-10	Q6	M-6	R13	K-4	R45	F-4	SW1	A-10
C24	H-23	Q7	M-8	R14	K-5	R46	F-6	SW2	A-7
C25	F-15	Q8	M-6	R15	K-5	R47	F-6	ZD1	H-6
C26	H-8	Q9	M-7	R16	J-12	R48	F-7	ZD2	I-25
C27	D-20	Q10	M-11	R17	K-14	R49	E-5	ZD3	I-27
C28	C-23	Q11	M-12	R18	L-17	R50	E-6	1C	L-25
C29	C-23	Q12	M-12	R19	J-14	R51	E-6	2B	J-18
CN1	A-21	Q13	M-13	R20	J-14	R52	E-10	2C	K-25
CN2	J-15	Q14	K-11	R21	I-3	R53	E-10	3A	F-4
CN3	N-28	Q15	K-12	R22	I-4	R54	E-10	3B	F-16
CN4	N-5	Q16	K-12	R23	H-6	R55	E-10	3C	G-24
CN5	N-10	Q17	K-13	R24	J-12	R56	E-10	4C	E-24
CN6	M-1	Q18	N-14	R25	I-12	R57	E-10	SR1	J-4
CN7	L-1								

TERMINAL GUIDES



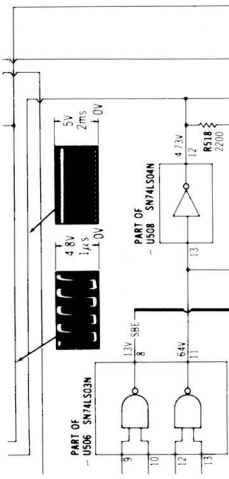


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COMPUTERFACTS™ put easy to use, informative technical data right at your fingertips. Each edition includes specific service information on the individual component, along with some overall troubleshooting hints.

The following information is just a sample of the many valuable time saving features contained in this exclusive Sams COMPUTERFACTS publication:

- Preliminary Service Checks section is an easy to use, step by step guide for the experienced technician or hobbyist, and even beginners.
- SAMS famous industry accepted standardized notation schematics containing CIRCUITRACE®, GRIDTRACE™, waveforms, voltages and stage identification.

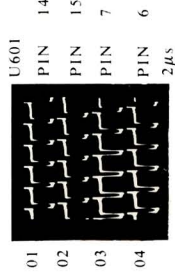


• Step by Step Troubleshooting guides the technician through the necessary procedures to quickly locate the problem.

TROUBLESHOOTING

MICROPROCESSOR CHIP (CPU) OPERATION

Verify the processor is functioning by checking the signals on the address lines (pins 10 thru 24 of IC U600) and the data lines (pins 41 thru 56) using a logic probe or a scope. If a logic probe is used, refer to the "Logic Chart" for the correct readings. If a scope is used, the waveforms on the address lines (except pins 22 and 23 which have no signal in Power Up mode) should be similar to Figure 1. The waveforms on the data lines should be similar to Figure 2.



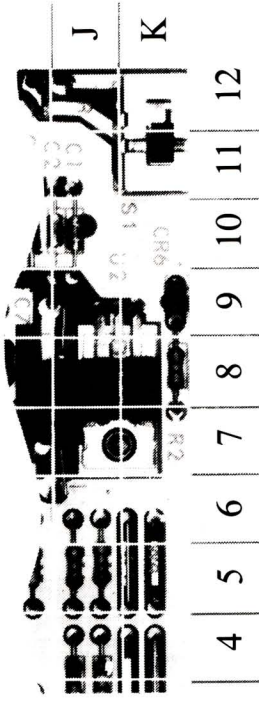
• Logic Chart containing logic probe readings to isolate defective circuitry and components.

LOGIC

PIN NO	IC U100	PIN NO	IC U100	PIN NO	IC U100	IC U101	IC U102	IC U103	IC U104	IC U105	IC U106	IC U107	IC U108	IC U109
1	P	21	P	1	P	L	L	L	L	L	L	L	L	L
2	P	22	P	2	P	P	P	P	P	P	P	P	P	P
3	P	23	P	3	P	H	H	H	H	H	H	H	H	H

Remove staples and use cover for file folder.

- Quick Component Location using the SAMS exclusive GRIDTRACE, CIRCUITRACE, and component photographs.



- Complete Components Parts List in an easy to use format with field replacements shown when possible. SAMS unique semiconductor, chip and IC cross-reference gives you many replacements to choose from and is available at your Electronic Distributor.

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFGR. Part No.	ECG Part No.	NTE Part No.	REPLACEMENT DATA	
					RCA Part No.	ZENITH Part No.
D102	1SS53	1149-2576	ECG519	NTE519	SK9091/177	103-131
D103	2N60FM	1149-2527	ECG109	NTE109	SK3088	103-Z9001
D201	1N4004GP	1201-4205	ECG116	NTE116	SK3312	212-76-02
D501 thru D503	1SS53	1149-2576	ECG519	NTE519	SK9091/177	103-131

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